

Bureau of Water Quality Planning's 5-Year Plan: July 2006 – June 2011

June 2006



Salmon Falls Creek below Highway 93 (2003)



Prepared by
Nevada Division of Environmental Protection
Bureau of Water Quality Planning

Bureau of Water Quality Planning’s 5-Year Plan: July 2006 – June 2011

Table of Contents

Background.....	1
Monitoring.....	3
Routine Water Chemistry Sampling.....	3
New Waters Sampling.....	4
Special Water Quality Sampling.....	4
Lake Studies.....	4
Bioassessment Sampling.....	6
Regional Environmental Monitoring and Assessment Program.....	6
Assessments and Assessment Tools.....	6
303(d) List and 305(b) Report.....	7
Carson River Report Card.....	7
Indices of Biological and Physical Integrity.....	7
Tiered Aquatic Life Use Development.....	8
Physical Habitat Assessments.....	8
Standards Activities.....	9
Overall Standards Schedule.....	14
Action Items Addressing 303(d) Listings.....	14
TMDLs.....	16
Statewide Strategies for Key 303(d) Listings.....	16
Basin-Specific 303(d) Action Items.....	18
Action Items Addressing Waters Warranting Further Investigation.....	19
Watershed Plans.....	19
NPS Activities.....	20
Laboratory Certification.....	20
Other Potential Future Activities.....	20

List of Tables

Table 1. Summary of Water Quality Sampling Schedule.....	5
Table 2. Summary of Bioassessment Sampling Schedule.....	6
Table 3. Carson River Report Card Schedule.....	7
Table 4. Bioassessment Index Development Schedule.....	8
Table 5. Schedule for Main Water Quality Standards Activities.....	15

List of Figures

Figure 1. Conceptual Rotational Approach for Monitoring, Standards Review, TMDL Development, Targeted 319 Projects.....	2
--	---

BWQP's 5-Year Plan: July 2006 – June 2011

Nevada Division of Environmental Protection

Bureau of Water Quality Planning

June 2006

Background

The purpose of this report is to present BWQP's activities that are expected to occur over the next 5 years (July 2006 through June 2011) and identify additional efforts that may be needed in the future. It is hoped that this document provides an overall picture of BWQP efforts within various categories (monitoring, standards, assessment, TMDLs, nonpoint source, etc.) and within each watershed. BWQP activities can generally be grouped into the following activities:

- Monitoring
- Assessment
- Water Quality Standards
- TMDLs/Watershed Plans
- Nonpoint Source project coordination, planning and management
- Public Education and outreach
- Laboratory Certification

This 5-year Plan provides an overall summary of the main BWQP activities and is intended to serve as a dynamic document that is revisited and revised as frequently as appropriate. More detailed information may be available in the individual workplans and other planning documents. The activities and dates described in this document are all subject to change depending upon modification to BWQP priorities, funding, staff, etc.

Long-term goals for BWQP:

- Improve water quality standards through more appropriate beneficial use assignments (including tiered aquatic life uses), more appropriate numeric criteria
- Protect existing water quality through the addition/revision of RMHQs (Requirements to Maintain Higher Quality)
- Provide protection of waters currently not in Nevada Administrative Code (NAC) through their addition to the NAC
- Develop effective TMDLs which address real problems (based upon appropriate beneficial uses and numeric criteria) and where needed to support local efforts to address the problems.
- Improve assessment tools through the development of biological/physical integrity indices and other tools
- Engage and empower local stakeholders to address water quality problems

NDEP is implementing a rotational approach as part of its efforts to meet these long-term goals (Figure 1). The rotational approach can generally be represented by 6 basic steps, with the first 5 steps taking approximately 4 years. Step 6 duration will be highly dependent upon the specific needs of the watershed under investigation.

1. **Select basin of interest** - Approximately each year, one new basin or subbasin will be selected for monitoring, standards review, and other work such as TMDLs, etc. if appropriate.

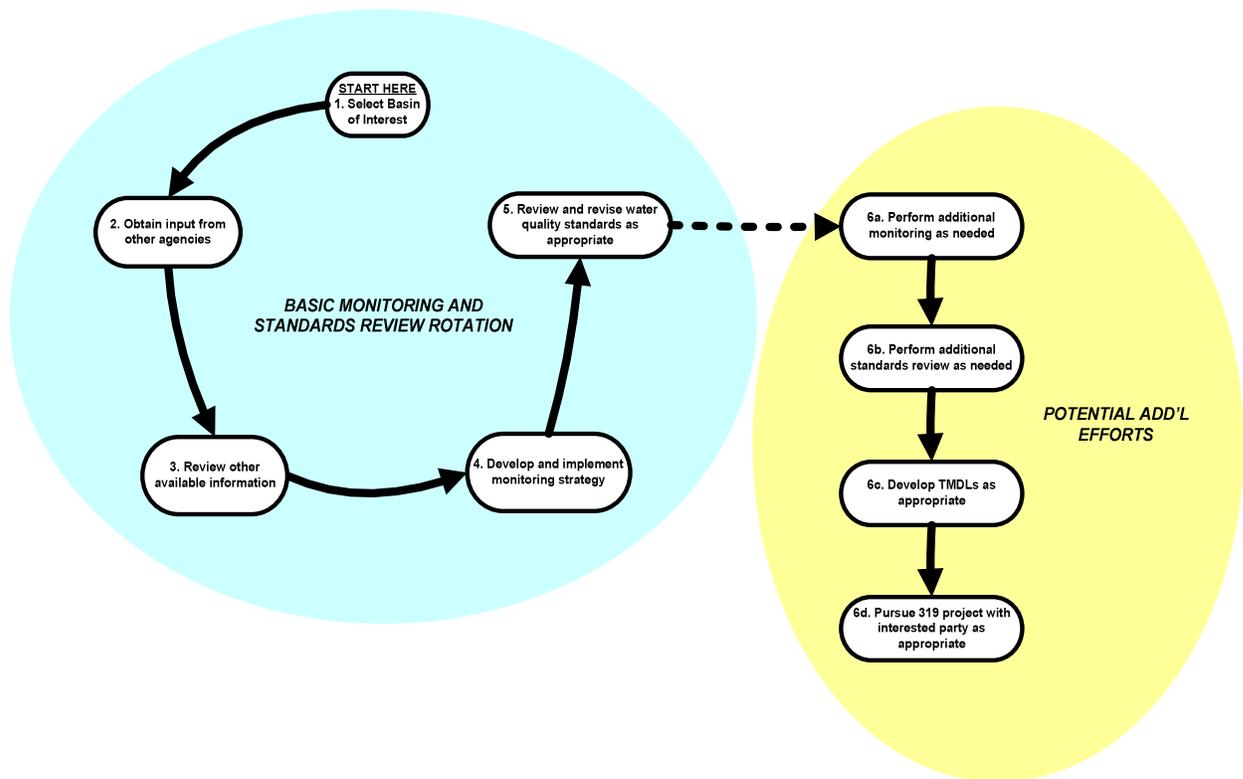


Figure 1. Conceptual Rotational Approach for Monitoring, Standards Review, TMDL Development, Targeted 319 Projects

2. **Obtain input from NDOW, USFWS, USFS, BLM, NRCS, conservation districts, irrigation districts, etc.** - Once a basin or subbasin is selected, NDEP will meet with various agencies and groups to solicit their input on special needs such as:
 - a. Addition of waters to the regulations
 - b. Revision of existing standards (beneficial uses and criteria)
 - c. Source assessments, TMDLs, watershed plan
 - d. Targeted 319 projects addressing nonpoint sources
3. **Compile and review other available information** – For the selected basin, NDEP will compile available information and data such as:
 - a. Previous rationales
 - b. 303(d) listings; list of waters warranting further investigation
 - c. Water quality data
 - d. Chemical, physical, biological assessments
 - e. Source assessments
4. **Develop and implement monitoring strategy** – For the selected basin, NDEP will design and implement a monitoring and data collection strategy as needed to meet NDEP’s and other’s needs. The collected data should be periodically reviewed for potential revisions to the monitoring strategy. In general, monitoring may take place for about 3 years depending upon the needs. Approximately each year, monitoring will commence for another new basin or subbasin such that for a given year, NDEP will be monitoring within at least 3 basins/subbasins
5. **Review and revise water quality standards as appropriate** – NDEP will then use the available data to review and potentially revise water quality standards within the selected basin/subbasin.

6. **Perform additional work as needed** - For some basins/subbasins, additional work beyond the above steps may be needed to further evaluate the standards, develop source assessments, TMDLs, and targeted 319 projects. It may be necessary to confer again with NDOW, USFWS, USFS, BLM, NRCS, conservation districts, etc. to identify needs for additional work. It is expected that any additional work will be undertaken only if truly needed to: 1) address a real problem; and 2) there is interest by local stakeholders to address the problem.

In addition to the activities tied to the above rotational approach, there will usually be additional projects that fall outside of the rotational design.

Monitoring

Monitoring efforts result in key chemical, physical and biological information needed for other BWQP activities, such as assessments (including assessment tool development), water quality standards, TMDLs, watershed plans, nonpoint project planning and implementation. Planned monitoring activities generally fall in the following categories:

- Routine water quality monitoring
- New waters sampling
- Special water quality monitoring
- Lakes studies
- Bioassessment sampling
- Probabilistic sampling (Regional Environmental Monitoring and Assessment Program)

The results of these monitoring efforts will be used in a myriad of ways: standards review/development, impairment assessment, source assessment, TMDL development, etc. A summary of these 5 types of monitoring efforts are described below.

Routine water chemistry sampling: Historically, BWQP has been monitoring approximately 100 sites on the main waters throughout the state. Sample frequency has varied from 3 to 12 times per year depending upon the waterbody. This system has been relatively static with the same locations being sampled showing the same “impairments” year after year. BWQP found it advantageous to redesign the monitoring program to free up resources needed to begin monitoring a variety of other waters throughout the state. Under the new approach, “base” and “full” sampling schemes have been established. A subset of the historic sites have selected as the “base” sites, while the “full” sites generally consist of the historic sites. In general, the “base” sites will be sampled 2 times per year (switching between spring-fall, or summer-winter combinations) with each season being represented during a 2 year period; the “full” sampling sites will be sampled 4 or more times per year as needed.

The purpose of the base sampling is to continue adding to the long-term record of the historic site, and to use the data as possible indicator of water quality trends. More detailed monitoring can be pursued if needed to further examine any potential trends. In general, the full sampling is used to develop more detailed data as needed for reviewing/revising the water quality standards, determining impairment status, TMDL development, etc.

Under this monitoring approach, a given set of waters will be covered under the full sampling while others are covered under the base sampling. Generally, the full sampling of a water will occur for about 2 to 3 years. However, additional years may be added as needed to support the standards review. Periodically, the full sampling will be rotated to a different set of waters as needed to meet the needs of other BWQP programs. Following the full sampling of a given water, BWQP will

undertake a review of the standards for that water as part of its Triennial Review. Table 1 presents the routine water chemistry sampling schedule during the 5-year planning period.

New water sampling: In addition to the routine water chemistry sampling, BWQP will also be performing full (4 times per year or more) sampling of waters which are not in the regulations¹. In some situations, the new water sampling occurs in the same basin scheduled for full sampling under the routing sampling program described above.

Following completion of the new waters sampling , BWQP will review the data and seek to include these waters in the regulations as appropriate. A summary of the full sampling schedule for new waters is presented in Table 1.

Special water quality sampling: In addition to the routine water chemistry sampling, special sampling efforts are being undertaken to support special assessments and water quality standards reviews not part of BWQP routine activities. Table 1 provides a summary of the special monitoring efforts taking place during this planning period.

Lakes studies: Under this effort, BWQP samples a selected group of Nevada lakes for 1 to 2 years (see Table 1).

¹ These waters are selected for standards review based upon input from others such as Nevada Department of Wildlife, Bureau of Land Management, and US Fish and Wildlife Service.

Table 1. Summary of Water Quality Sampling Schedule

Region/Water	Fiscal Year									
	2007	2008	2009	2010	2011					
<i>Rotational Water Sampling Network for waters currently in NAC (F = full sampling; B = base sampling)</i>										
Snake Basin	F	B	B	B	B	B	B	B	B	B
Steamboat and Tributaries	F	F	F	B	B	B	B	B	B	B
Upper Humboldt Tributaries	B	F	F	F	F	F	F	B	B	B
Lower Humboldt Tributaries	B	B	B	F	F	F	F	F	F	B
Humboldt River Mainstem	B	B	B	B	B	F	F	F	F	F
Colorado Basin	B	B	B	B	B	B	B	F	F	F
Carson Basin	B	B	B	B	B	B	B	B	B	F
<i>Rotational Water Sampling Network for waters not in NAC</i>										
Snake Basin	X									
Steamboat Tributaries	X	X	X							
Walker Basin (Bodie and Rough Creeks)	X	X	X							
Black Rock Desert	X	X	X	X	X					
Central Region	X	X	X	X	X					
Upper Humboldt Tributaries		X	X	X	X	X	X			
Lower Humboldt Tributaries				X	X	X	X	X	X	
Humboldt River Mainstem						X	X	X	X	X
Colorado Basin								X	X	X
Carson Basin										X
<i>Special Projects Monitoring for waters currently in NAC</i>										
Truckee Basin (Bronco & Gray Creeks)	X	X	X							
Lahontan Valley waters (beneficial use review)	X	X								
Black Rock Desert (Smoke Creek)	X	X	X	X	X					
Walker Lake	X	X	X	X	X	X	X	X	X	X
Central Region - RMHQs	X	X	X	X	Continued as needed/appropriate					
<i>Lakes Studies</i>										
Basin??	X	X	X							
Basin ??				X	X	X	X			
Basin??								X	X	X

Bioassessment Sampling: Bioassessment sampling has been occurring since 2000. The goal of this program has been to obtain 3 to 5 years of bioassessment data in each basin. Once a basin has this baseline of data, the sampling frequency generally switches to every other year. Truckee River is the exception with sampling occurring every year in coordination with the Pyramid Lake Paiute Tribe and the Truckee Meadows Water Reclamation Facility. Table 2 summarizes the bioassessment sampling schedule for this planning period and beyond. In general, these activities include macroinvertebrate sampling, water quality sampling, physical habitat characterizations, and recording other related observations.

Table 2. Summary of Bioassessment Sampling Schedule

Sampling Scheme/Basin	Fiscal Year										
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
Rotation Group 1											
Central Region		X	X			X	X				X
Colorado Basin		X	X			X	X				X
Humboldt Basin		X	X			X	X				X
Northwest Region	X	X	X			X	X				X
Snake Basin		X	X			X	X				X
Rotation Group 2											
Carson Basin	X			X	X			X	X		
Central Region (east portion)	X			X	X			X	X		
Steamboat Basin	X			X	X			X	X		
Tahoe Basin	X			X	X			X	X		
Walker Basin	X			X	X			X	X		
Rotation Group 3											
Truckee Basin	X	X	X	X	X	X	X	X	X	X	X

Regional Environmental Monitoring and Assessment Program (REMAP): Beginning in 2006, NDEP is embarking on a 3-year REMAP project to establish a classification system and evaluate, through monitoring and data analysis, the conditions of the physical habitat, water chemistry, and biological conditions of wadeable 1st, 2nd and 3rd order perennial surface waters throughout the state. These goals will be accomplished through the comparison of probabilistic sites monitoring data against targeted reference site conditions and the development of indices. In support of this effort, a number of reference sites and probabilistic sites will be sampled in 2006 & 2007, followed with a report in 2008. Extensive sampling/characterizations will occur including macroinvertebrates, periphyton, fish, water chemistry, chlorophyll a, sediment chemistry, fish contaminants, and physical habitat measurements.

Assessments and Assessment Tools

Efforts under this category include assessments of water quality standards compliance and the health of Nevada’s water systems, and develop improved tools for performing such assessments. Information created as part of these activities support other efforts such as TMDL/Watershed Plan development, water quality standards review and revision, and nonpoint source project design and planning. Eventually these efforts will lead to more holistic stream assessments incorporating chemical, physical and biological factors.

303(d) List and 305(b) Report: Every 2 years, BWQP develops a 303(d) List and a 305(b) Report. Most of the listing decisions are based upon compliance with numeric water quality criteria with little to no evaluation of biological and physical conditions. Beginning in 2006, NDEP initiated development of an Integrated 303(d)/305(b) Report.

Carson River Report Card: The objective of the Carson River Report Card is to gather considerable information on the chemical, physical and biological condition of the river as affecting the aquatic life. An accurate characterization of these 3 factors is needed as an essential foundation for future efforts. It is hoped that this process will be useful in reviewing (and possibly revising) aquatic beneficial uses and the associated water quality criteria; and developing appropriate TMDLs and watershed plans. A schedule of the main activities is provide in Table 3. Upon completion of the Report Card, appropriate next steps such as standards revisions, TMDLs, etc. will be undertaken as needed.

Table 3. Carson River Report Card Schedule

Main Activity	Fiscal Year		
	2007	2008	2009
Physical Condition Characterization			
Lahontan Reservoir Assessment			
Temperature Assessment			
Nutrients Assessment			
Biological Condition Assessment			
TSS/Turbidity Assessment			
Findings and Recommendations Report			

Indices of Biological and Physical Integrity: Indices of biological and physical condition attempt to quantify environmental conditions through careful measurement of key attributes of biological communities and physical systems. Indices can be based upon the condition of various communities: such as macroinvertebrates, fish, and periphyton. Physical habitat indices are based upon the condition of the physical environment affecting these communities.

Macroinvertebrate, periphyton and fish indices have been developed for the Truckee River and will be reviewed as needed. BWQP will be working toward the development of indices for the other mainstem waters in Nevada, and for other waters throughout the state. Once developed, indices will need to be reviewed periodically and recalibrated as needed. The approximate schedule for bioassessment index development provided in Table 4.

As discussed in the **Monitoring Activities** section, NDEP is embarking on a 3-year REMAP project to establish a classification system and evaluate, through monitoring and data analysis, the conditions of the physical habitat, water chemistry, and biological conditions of wadeable 1st, 2nd and 3rd order perennial surface waters throughout the state.

Table 4. Bioassessment Index Development Schedule

Basin	Fiscal Year				
	2007	2008	2009	2010	2011
Truckee River - IBI	X				
IBI recalibrated	X	X	X		
Carson River – IBI	X				
IBI recalibrated			X	X	X
Virgin and Muddy Rivers – IBI	X				
Humboldt River – IBI		X	X		
Owyhee River – IBI			X	X	
Walker River – IBI				X	X
???					
???					

Tiered Aquatic Life Use (TALU) Development: Few choices exist when assigning aquatic life uses to waters under Nevada’s current regulatory system. Generally, a use of “propagation of aquatic life” is assigned to all waters with some recognized as either coldwater or warmwater systems. However, a tiered system provides for more “...levels of protection and reflects the choices implicit in reconciling the "ideal" (represented by least impacted reference conditions) with the "reality" the ongoing effects of two centuries of intensive human use of the state's land and water resources.” (Ohio's Tiered Aquatic Life Use Designations Turn 20 Years Old, <http://www.epa.gov/waterscience/biocriteria/casestudies/aquaticlifeohio.html>)

TALU development generally occurs after the development of the bioassessment indices. These efforts will first be undertaken on the Truckee River which has significant biological information and indices already developed. Nevertheless, this work is expected to take several years. TALU work on the Carson system will follow. The functionality of the tiered uses will need to be tested for years before they can be incorporated into Nevada’ standards. Until then, tiered uses are viewed as another ecosystem assessment tool and not a regulatory instrument.

Physical Habitat Assessments: As part of the standards review and development process, NDEP is initiating an effort whereby physical habitat conditions are characterized using protocols taken from EPA’s Rapid Bioassessment Protocols and California’s Bioassessment Procedures. These activities will generally occur on new waters to be added to the regulations and some existing (currently in the NAC) waters as needed. This information, along with other biological information, will help us better understand the level of beneficial use support (an important component of standards reviews). Also, it is hoped that this information will improve our understanding of possible impairment sources (other than just relying on water quality grab samples) and better guide our follow-up actions, such as more detailed source assessments, Use Attainability Analyses, TMDLs, etc.

Standards Activities

Water quality standards (beneficial uses and numeric criteria) are the foundation of the Clean Water Act Program. Appropriate standards are needed to ensure that subsequent actions (discharge permits, assessments, TMDLs, Watershed Plans, nonpoint source projects) are appropriate. According to the CWA Section 303(c), states "...shall from time to time (but at least once each three year period beginning with October 18, 1972) hold public hearings for the purpose of reviewing applicable water quality standards and, as appropriate, modifying and adopting standards." To meet these requirements (referred to as Triennial Review requirements), BWQP will periodically review standards for waters throughout the state, and other statewide standards (such as toxics, NAC 445A.144). Waters will be examined on a rotational basis whereby each year or so different waters will be evaluated for potential water quality standards revisions. The monitoring activities have been planned so as to provide the necessary water quality information in support of these standards reviews (see **Monitoring** Section). Additionally, special standards review activities are undertaken as needed.

As part of the rotational, statewide and special standards reviews, a number of standards activities are being undertaken to meet the following goals:

1. Improve beneficial use assignments
2. Improve numeric water quality criteria
3. Protect waters not in regulations
4. Improve protection for class waters
5. Protect existing water quality

Following is a discussion of each of these goals, and BWQP's overall approach to meet these goals in the coming years:

1) Improve beneficial use assignments

Propagation of aquatic life: All waters in the regulations have "propagation of aquatic life" as a beneficial use with some differentiation between coldwater and warmwater systems. These uses need to be further refined to recognize the natural and human-caused differences between the systems. Many states have developed (and are developing) tiered aquatic life uses to improve beneficial use assignments. BWQP's position is to first incorporate this type of approach in our assessments, but not yet in our regulations (see **Assessment** Section, *Tiered Aquatic Life Uses*).

In order to refine some of the existing aquatic life use designations in the NAC, NDEP would need to develop Use Attainability Analyses. However according to Chris Yoder, Midwest Biodiversity Institute & Center for Applied Bioassessment and Biocriteria (2002):

The UAA process needs to be "under girded by an adequate monitoring and assessment infrastructure, in which tiered uses linked to biological criteria and supporting chemical and physical indicators produce an integrated assessment and recommendations for water quality standards revisions. When such an infrastructure is in place, UAAs become a matter of comparative routine, as opposed to becoming a resource intensive endeavor with little promise of outcome where such an infrastructure is lacking."

Until bioassessment indices and tiered aquatic life use system are in place, NDEP's review/assignment of aquatic life beneficial uses in the NAC will likely be limited.

Municipal and domestic water supply & contact recreation: Most waters in the regulations have “municipal and domestic water supply” as a beneficial use regardless of whether or not they are actually being used for this purpose. The likelihood that many of these waters will ever be used for a drinking water supply is limited. At this time, the plan is to first review this use on waters below Lahontan Reservoir. Concurrently, NDEP will be reviewing other uses of these waters. Based upon the outcome of that effort, other waters will be examined in the future using lessons learned.

As discussed in Item 3 below, NDEP will be adding waters and associated water quality standards to the NAC. NDEP will be examining these waters for the potential inclusion of municipal and domestic supply (MDS) as a beneficial use. In the evaluation, NDEP will be considering a number of factors, such as 1) evidence of MDS being an existing use; 2) evidence that water meets MDS water quality criteria. *Waters not falling in to these categories may not necessarily be assigned MDS as a use.* Each water will need to be evaluated on a case-by-case basis.

2) Improve numeric water quality criteria

The numeric criteria for a number of constituents are in need of improvement. Generally, the most-recent EPA guidance is used to update numeric criteria for various constituents. However, in some cases there are concerns about the applicability of these guidance recommendations. In other instances, newer science and guidance is needed or underdevelopment. Many of these issues are also facing the entire country not just Nevada. National efforts are underway to provide guidance to the states on a number of these criteria. Because the scopes of these issues are so large, Nevada will likely need to rely on these nationwide efforts for improved criteria. Unfortunately, it expected to take years before new EPA guidance is issued for some parameters. Of particular interest are improved criteria for nutrients, total suspended solids, temperature, and iron (some of the most prevalent 303(d) listings). In a recent EPA document (*Strategy for Water Quality Standards and Criteria*, 2003), their ten highest priority actions were identified. Of particular interest are Priority Items 3 and 4:

- 3. Produce and implement a strategy for the development of suspended and bedded sediment criteria*
- 4. Provide technical support to states and tribes for developing and adopting nutrient criteria and biological criteria*

As progress is made in these large efforts, revisions can be incorporated into the regulations as BWQP reviews its water quality standards. Following is a background discussion on the major water quality criteria challenges facing NDEP (nutrients, TSS, temperature and iron) and Nevada’s strategy for addressing these issues.

Nutrients

In 1998, EPA Region IX formed the Regional Technical Assistance Group (RTAG) to assist in the development of appropriate nutrient criteria in the region. Nevada, Arizona and California agency representative have been participating in a series of meeting and publication reviews. With the assistance of TetraTech, RTAG has been slowly making progress toward improved nutrient standards. TetraTech has concluded that nutrient concentrations (both nitrogen and phosphorus species) alone are poor predictors of the likelihood of impairment. Other factors such as substrate conditions, light, flow, turbidity, etc. also affect algal dynamics and potential

dissolved oxygen problems. TetraTech and the RTAG have concluded that other secondary indicators (such as benthic algae density, dissolved oxygen) provide more direct evidence of nutrient impairment status and have developed a matrix of allowable threshold values for these indicators. The RTAG has decided that it is not in a position to recommend numeric nutrient criteria to the various California State Boards. Instead, the recommended approach is for the Water Boards to use the various algae density, dissolved oxygen levels, etc. as nutrient numeric endpoints for TMDLs throughout California. TetraTech has provided some simplified modeling tools that may be useful for translating the secondary indicator thresholds into comparable nutrient criteria. Also through the TMDL development process (in California), significant data will be collected which can be used to provide links between the secondary indicators and nutrients. From these data collection/analysis efforts, the Water Boards can begin to develop more site-specific nutrient criteria.

NDEP will be evaluating the simplified modeling tools for possible support in setting numeric criteria for stream and lakes. NDEP will continue to follow the RTAG process closely in hopes of finding applicable approaches for refining Nevada's nutrient criteria.

In addition, the Desert Research Institute is initiating a \$2 million study, with one of the tasks entitled "Field and Simulation Studies in Support of Nutrient Criteria Development". It is anticipated that this project will provide further input to the complex nutrient criteria revision process. However, the workplan and time schedule has yet to be finalized. As this project moves forward, DRI will be forming a technical advisory group to help guide their efforts.

It is hoped that the efforts of the RTAG and the DRI projects will help NDEP formulate a more detailed strategy for improving nutrient criteria. Until that time, NDEP's strategy for nutrient criteria includes:

- Continued involvement in the RTAG process
- Begin evaluating TetraTech's modeling tools for translating secondary indicators to nutrient criteria
- Involvement with DRI study through the Technical Advisory Group
- Keep existing phosphorus criteria untouched until further progress made by RTAG and DRI.
- Add nitrate and orthophosphate (OP) RMHQs to the NAC where appropriate

- NDEP is proposing a rotational schedule for the addition of new waters to the NAC. NDEP will continue to examine these waters on a case-by-case basis to determine what, if any, numeric nutrient criteria should be assigned to these new waters².

Total Suspended Solids and Turbidity

The EPA Office of Water is preparing to develop and issue water quality criteria (either recommended values or methodologies) for the states to better manage Suspended and Bedded Sediments (SABS) in waters across the country. TSS and turbidity thresholds are being examined as part of this effort. While some draft documents have been produced, it is unknown when any final guidance will be available. Until any final guidance is issued, NDEP is in a holding pattern with regards to possible revisions of our TSS and turbidity standards. During the rotational standards reviews discussed above, there appears to be little that NDEP can do to improve the existing TSS/turbidity standards. Until that time, NDEP will continue to incorporate TSS/turbidity standards into the NAC as appropriate.

Temperature

Nevada's current temperature criteria are not well documented and are in need of review. NDEP is investigating the need to develop improved temperature criteria which include duration considerations (such as Maximum Weekly Average Temperature) rather than just the single values now prevalent in the NAC. NDEP is currently contacting local specialists to obtain their input on the suitability of the existing standards, and the potential for updating the standards. In addition, NDEP is tracking temperature criteria development in other states such as Colorado. It is hoped that information gleaned from the efforts of others may be helpful in reviewing Nevada's temperature criteria. Until more information becomes available, NDEP will continue to add temperature criteria into the NAC based upon previous recommendations from fish and wildlife agencies, as appropriate, or use more current recommendations.

Iron

NDEP believes that the iron standard of 1,000 ug/l is in need of revision, however there is no national guidance for such an effort. Recognizing the need, other states have been pursuing changes to their iron standards³. A study was recently completed for West Virginia that used bioassessment information to develop more

² One possible alternative that is being discussed is the use of nitrate and orthophosphate (OP) levels as indicators of potential eutrophication problems. As indicators, nitrate/orthophosphate thresholds would not be included in the NAC but an evaluation process could be presented in the CPP (Continuing Planning Process). For waters exceeding these indicator level, future studies would be needed to determine whether or not the nitrate/OP levels are causing problems with excessive algae and/or dissolved oxygen levels. NDEP is developing a Visual Nutrient Screening Protocol that could be used to begin screening these waters for potential eutrophication problems.

³ Ohio recently deleted the iron standard of 1,000 ug/l for Ohio River Basin waters. Based upon biological monitoring, Ohio concluded that healthy aquatic populations are present in waters which exceed the 1,000 ug/l criteria.

appropriate iron criteria.⁴ Unfortunately, this study was performed by Electric Power Research Institute (EPRI) and is only available to EPRI members. NDEP will continue efforts to obtain a copy of this study. As additional biological monitoring data and assessment tools are developed, NDEP may be in the position to undertake a similar approach to revise our iron criteria. Until that time, NDEP is in a holding pattern for possible iron standard revisions.

3) Protect waters not in regulations

There are numerous waters throughout the state that are not explicitly mentioned in Nevada's regulations. Some of these waters are of high quality and in need of protection from future impairment. Others are considered high-risk waters due their proximity to ongoing/potential land use activities. BWQP will be gradually including additional waters in the regulations as needed. Input from the various resource management agencies (BLM, USFWS, USFS, NRCS, NDOW) will be useful in identified some of these waters.

4) Improve protection for class waters

Under the existing system, waters are grouped into classes with each group having its own set of beneficial uses and criteria. BWQP is in the process of dismantling the class water system. Under the proposed revisions, each water would have its own set of uses and criteria so it can stand on its own merits. In addition, criteria would be added for some other constituents such as TSS, turbidity, nitrogen, color, etc. Under this structure, each water could potentially have its own unique set of numeric criteria as needed.

5) Protect existing water quality

Currently, Nevada regulations use RMHQs (Requirements to Maintain Higher Quality) as its antidegradation control. In general, only the major waters have RMHQs. At this time, BWQP is working to develop a more statistically sound methodology for setting RMHQs. Using the new methodology, BWQP will begin reviewing the existing RMHQs and adding RMHQs for other waters as appropriate.

Current regulations for the major streams include both RMHQs and Beneficial Use criteria. This has been confusing and BWQP had previously considered consolidating these two columns into one. However, recent discussions have suggested that retaining the 2 column system would be valuable as NDEP is faced with antidegradation issues in the future. NDEP has been discussing the possible need to establish an anti-degradation policy that addresses the various issues related to RMHQs and those waters without RMHQs.

⁴ The involved parties decided to derive an updated iron criterion using bioassessment data rather than laboratory results. It was concluded that various negative effects associated with the precipitation of iron colloids would be difficult to simulate in laboratory experiments.

As part of an overall strategy to meet the above-referenced goals for water quality standards, BWQP has implemented a rotational design (similar to that described under the Monitoring section) for its standards review/revision process under which a variety of activities will take place. Monitoring activities have been scheduled as needed to provide the data necessary for the review/revision activities.

Overall Standards Schedule

NDEP's standards-related activities during the 5-year planning period will consist of reviews/revisions of existing water quality standards, the addition of new waters to the Nevada Administrative Code, and other special projects for various waters, and statewide activities (Table 5). Those efforts to review/revise existing standards and to add new waters to the standards will be undertaken in a rotating fashion linking to the monitoring rotational design

Action Items Addressing 303(d) Listings

Nevada has long asserted that our 303(d) List is one of our planning documents for guiding our water quality management efforts. The main suite of actions that NDEP could undertake to address a given listing include:

- Analyze more current data and information to verify impairment
- Perform additional monitoring, field surveys/assessments and analysis to verify impairment
- Modify the water quality criteria
 - If information/guidance not available or will be developed only after a long effort, and impairment is not obvious, assign the waterbody-pollutant a low TMDL priority
- If a water was listed under the tributary rule:
 - Perform field investigations to determine if tributary rule should apply AND/OR
 - Assign more appropriate standards for the tributary
- Perform source assessment (could occur at varying levels of detail depending upon the waterbody) – Use the results as a decision document to determine appropriate next actions such as criteria adjustment (if naturally occurring), UAA, or TMDL
- Perform Use Attainability Analysis (or components of a UAA)
 - Determine if listing due to natural causes
 - Determine if natural, ephemeral, intermittent or low flow conditions prevent the attainment of the use
 - Determine if dams, diversions or other modifications preclude attainment of the use
- Develop TMDLs
- Pursue Targeted 319 projects to correct problem

Undertaking all of the appropriate activities (from the above list) for all 303(d) Listed waters would require significant funding, which is currently not available. Therefore, it becomes necessary for BWQP to prioritize a subset of the 303(d) waters for which more detailed efforts are appropriate. As part of the priority development effort, BWQP will meet with the various resource management agencies (BLM, USFS, NRCS, USFWS, NDOW) and others to determine their level of interest and ability to address 303(d) Listings, and confer on appropriate actions to address the various listings. As NDEP moves into a basin/subbasin as part of the rotational approach, the 303(d) list will be used as a guide to determine appropriate next steps.

Table 5. Schedule for Main Water Quality Standards Activities

Region/Water	Fiscal Year				
	2007	2008	2009	2010	2011
Rotational Water Sampling Network for waters currently in NAC					
Muddy River		X	X		
Snake Basin		X	X		
Steamboat and Tributaries			X	X	
Upper Humboldt Tributaries					X
Lower Humboldt Tributaries					X
Rotational Water Sampling Network for waters not in NAC					
Snake Basin		X	X		
Steamboat Tributaries			X	X	
Walker Basin (Bodie and Rough Creeks)			X	X	
Black Rock Desert				X	X
Central Region				X	X
Upper Humboldt Tributaries					X
Lower Humboldt Tributaries					X
Special Projects for waters currently in NAC					
Carson River Report Card	Followup activities to be determined upon completion of the Report Card				
Truckee Basin (Bronco & Gray Creeks)			X	X	
Lahontan Valley waters (beneficial use review)			X	X	
Black Rock Desert (Smoke Creek)		X	X		
Central Region - RMHQs	Pending results of monitoring				
Statewide Activities					
Update toxics criteria for "aquatic life" uses based upon EPA guidance	X				
Update molybdenum criteria for "aquatic life" uses				X	X
Dismantling of the Class Waters system	X				
Addition of E coli & ammonia to Class Waters	X				
Participation of Regional Technical Advisory Group focused on Nutrient Criteria for Region IX	Date of conclusion uncertain				
Work with NDOW, others to evaluate appropriateness of current temperature standards	Date of conclusion uncertain				

TMDLs

In 2004, NDEP developed a concept paper discussing issues related to water quality standards and TMDLs, and BWQP's approach for handling these issues. As described in the concept paper, a majority of Nevada's 303(d) listings have significant issues associated with beneficial uses and numeric criteria appropriateness. Inappropriate uses and criteria could lead to unsuitable TMDLs. Nevada desires to first address the use/criteria issues (see **Standards** Section) and verify that a use impairment actually exists before developing a TMDL. Taking this another step, BWQP also desires to only develop TMDLs for those waterbodies where there is interest by local entities, resource management agencies, etc. to begin addressing the problem through targeted 319 projects⁵. Without this interest, the TMDL ends up being just another document on the shelf. If both of these conditions (impairment verified, interest exists) do not exist, NDEP proposes to not develop TMDLs for these waters unless there are extenuating circumstances.

While BWQP believes that the above approach is needed to create realistic and defensible water quality criteria and TMDLs, it is recognized that significant resources (time, money, etc.) may be needed to meet these needs. It will be years before some of these issues can be resolved. In the meantime, BWQP has proposed to provide some TMDLs. Following is a summary schedule of the TMDLs to be developed during this planning period:

- Carson TMDLs
 - TSS/turbidity TMDLs - 2006

- Lake Tahoe
 - Technical TMDL – 2006
 - Final TMDL – 2008

- Truckee River 3rd Party TMDL Review – 2006/2007

Additional TMDLs may be identified as BWQP works through the numerous issues (inappropriate uses/standards, natural causes, etc.) associated with the 303(d) List and coordinates with the various resource management agencies.

During fiscal year 2007, the City of Carson City will be evaluating the potential for discharging a portion of its treated effluent to the Carson River. If this proposal goes forward, Waste Load Allocations will need to be developed to protect the river and Lahontan Reservoir.

Statewide Strategies for Key 303(d) Listings

Following are some general statewide strategies for key listings. However, it must be recognized that each water is unique and could require a varied approach. However it is hoped that over the years, NDEP can make progress on these activities. A complicating factor is the dynamic nature of Nevada's waters which could require multi-year studies to adequately understand any potential problems.

⁵ The existence of TMDLs/watershed plans are a condition for the expenditure of some 319 funds.

Total Phosphorus Listings

As discussed in the **Standard Activities** section, NDEP will continue to work toward improved nutrient criteria. NDEP has developed draft protocols for the visual surveying of flowing waters for potential algal biomass and eutrophication problems. It is hoped that NDEP can begin using these protocols to identify whether or not certain TP-listed waters are experiencing nutrient-related problems.

TSS/Turbidity Listings

As discussed in the **Standard Activities** section, NDEP will continue to work toward improved TSS/turbidity criteria. For those TSS/Turbidity-listed waters where there is local/agency interest in addressing a problem (if found to be real), NDEP will work with that interest as needed (and as resources allow) to improve the waterbody.

Total Iron Listings

As discussed in the **Standard Activities** section, NDEP will continue to work toward improved iron criteria.

Temperature Listings

As discussed in the **Standard Activities** section, NDEP will continue to work toward improved temperature criteria. NDEP and NDOW are working together to summarize water temperature statistics for streams in Northern Nevada based upon data collected by NDOW and BLM. By relating the temperature data to watershed characteristics such as elevation, area, shape, it is hoped that some guidance can be provided for establishing more appropriate temperature criteria.

Lake Listings

In many cases, Nevada needs to develop standards (uses and criteria) more appropriate for lakes recognizing lake/reservoir limnology dynamics and changing water levels due to water management decisions (for many lakes, the primary use is irrigation). However, this type of action could be a large undertaking requiring extensive monitoring with profiles at various locations within the lake. It may be appropriate to identify compliance points (at least for some constituents – temperature, dissolved oxygen) as locations out in the waterbody rather than from the shore or near-shore. Another possible action is to limit lake/reservoir sampling to locations out in the waterbody rather than from shore/near-shore sites.

TDS Listings

For those waters listed for TDS, BWQP's strategy is to first complete the Lahontan Valley waters reviews (drinking waters). Lessons learned from action will be helpful in determining next steps for the TDS listings.

Zinc Listings

Exceedances of the dissolved zinc criteria were identified on a number of waterbodies. However upon close examination of the data, the dissolved zinc concentrations were found to be significantly greater than the total recoverable concentrations in many cases. Recent investigations have indicated that there may be a problem with the filters being used. Beginning

in January 2006, NDEP switched to new filters but results are not yet in as to whether or not the new filters have improved the situation.

Copper Listings

One problem with the past copper data has been the rounding of values to the nearest 10s of ug/l. With many values near the copper standard, it became difficult to determine whether or not the standards were being met. In some instances, the copper concentration was reported as an estimated level sometimes below the method detection limit of 20 ug/l. NDEP had concerns about using estimated data for determining 303(d) listing. Recently, the State Health Laboratory has implemented a lower detection limit of 2 ug/l. With a lower method detection limit and the discontinuation of reported estimated levels, it is expected that many of these 303(d) listings will be removed. However, at least another listing cycle is needed before many of these waters will be removed from the list.

Basin-Specific 303(d) Action Items

Following are some key basin-specific 303(d) action items for the current planning period. These actions are intended to augment those identified in the **Statewide Strategies for 303(d) Listings** section. As discussed above, NDEP is proposing to not develop additional TMDLs beyond those identified in the **TMDLs** section, unless a real problem has been identified and there is interest by area resource management agencies and/or local stakeholders to address the problem.

Snake Basin

See **Statewide Strategies for Key 303(d) Listings** section.

Steamboat Creek and Tributaries Activities

Steamboat Creek: Steamboat Creek below Steamboat Springs experiences extremely high levels of arsenic and boron. For this reach below Steamboat Springs: 1) NDEP is proposing to perform a source assessment evaluating the contribution of natural sources (springs) to the arsenic and boron impairment; and 2) NDEP will consider revising the arsenic and boron standards recognizing that natural sources are causing the standard exceedances.

Whites Creek: Whites Creek is listed for exceedances of the drinking water standards for arsenic and TDS; and for exceedances of irrigation standards for boron. As with Steamboat Creek, it is believed that exceedances are due to geothermal sources in the area. This will be investigated during the Steamboat Creek and tributaries standards review in 2008, followed with a possible change in the standards recognizing natural levels.

Humboldt Basin Activities

Molybdenum Standard: During the Humboldt River standards review, NDEP will pursue revision of the existing molybdenum standard. This standard was taken from San Joaquin River (California) standards which used limited toxicity test data in setting the standard.

Colorado Basin Activities

Muddy River: During Fiscal Years 2007/08, BWQP will be reviewing standards for the Muddy River. Potential actions include: 1) moving mid-control point from “Glendale” to the “Wells Siding Diversion to Bowman Reservoir⁶”; 2) assigning fluoride standards recognizing that fluoride levels may be due largely to natural sources; 3) assigning manganese and boron standards recognizing that high levels are largely due to dewatering of the lower stretch; 4) revision of molybdenum standard⁷; and 5) revising temperature standards recognizing that high levels largely due to natural sources. Additionally, NDEP will be examining the need to break the lower reach into 2 reaches with the Wildlife Refuge being the dividing point. Diversions at the Wildlife Refuge often dewater this reach resulting in differing conditions downstream compared to upstream of the diversion. NDEP will be considering the need for a UAA to reclassify the aquatic life use for this lower reach as “limited aquatic life” with less restrictive toxics standards.

Carson Basin Activities

See **Statewide Strategies for Key 303(d) Listings** section. Also, NDEP is working on an extensive assessment of the Carson River (See **Assessments and Assessment Tools** section; **Carson River Report Card**). Upon the completion of the Report Card, specific actions will be recommended.

Action Items Addressing Waters Warranting Further Investigation

The 2002 and 2004 303(d) Lists both included a table of waters that had insufficient data to support listing. However, the available data indicated that there was a potential for impairment. Therefore, these waters were put on another list entitled “Waterbodies Warranting Further Investigation”. Recently, EPA has been interested in NDEP taking some action on this list. Given the limited resources, NDEP would like to focus on those waters potentially impaired as a result of upstream mining activities. However, before BWQP undertakes this effort, discussions with the Bureau of Mine Regulation and Reclamation (BMRR) are needed. One of the first activities needed is an inventory of other additional information which may aid NDEP in determining whether or not these waters are impaired. Based upon discussions with BMRR and a review of available data, a schedule of activities will be developed.

Watershed Plans

The development of Watershed Plans (with 9 required elements) has become a condition for the expenditure of some Clean Water Action 319(h) funds. Following is a summary of the status of ongoing watershed plan development activities:

Carson River: watershed plan is underdevelopment by Carson Water Subconservancy District; completion 2006

Truckee River: NDEP staff will be reviewing available documents to determine if the 9 elements are addressed; activity will occur during 2005/06

⁶ Below this point, the reach is dewatered due to diversions to Bowman Reservoir, thereby greatly limiting beneficial uses.

⁷ The existing molybdenum standard was taken from San Joaquin River (California) standards which used limited toxicity test data in setting the standard.

Las Vegas Wash/Lake Mead: 208 Plan documents satisfy the 9 elements required for a watershed plan

Lake Tahoe: EIP (Environmental Improvement Program) currently serves as Watershed Plan. Technical TMDL will be completed in 2006.

NPS Activities

NPS are involved in a variety of activities including participation in a number of inter-agency planning meetings, local stakeholders meetings, conference planning, etc. BWQP also awards 319(h) grants and manages the contracts for nonpoint source projects which can include educational efforts and stream/watershed improvements. BWQP staff also plan and conduct numerous water education workshops and other related activities. Nonpoint source assessments are also developed within this program. Watershed plans are being required by EPA as a condition for the award of 319(h) grant. BWQP is participating in the efforts to ensure that watershed plan are in place for basins in need.

With the recent creation of the Lake Tahoe Unit, the NPS Branch Supervisor position has been vacated with responsibilities for supervision of the branch taken over by the BWQP Bureau Chief. BWQP is continuing to pursue opportunities to fund the NPS Branch Supervisor position. The refilling of the position will be key to the success of BWQP's proposal to confer with NDOW, USFWS, USFS, BLM, NRCS, Conservation Districts, etc. in identifying potential targeted 319 projects and standards and TMDL activities needed to support such projects. A number of MOUs (Memoranda of Understanding) have been entered into between NDEP and BLM, NRCS, USFS, etc. largely related to nonpoint source activities in the State. The re-establishment of the NPS Branch Supervisor position will be needed for these MOUs to be implemented.

Laboratory Certification

Environmental laboratories that analyze water samples for compliance purposes must be certified by the State or the United States Environmental Protection Agency (USEPA). In Nevada, BWQP certifies environmental laboratories for drinking water and wastewater analysis. The primary mission of the Environmental Laboratory Certification Program is to provide guidance, expertise and regulatory oversight to certified environmental laboratories for the purpose of ensuring public access to competent and reliable laboratory services. As these activities are ongoing, no timeline information has been provided.

Other Potential Future Activities

There are a number of activities not discussed above nor identified in the 5-year timeline that could potentially occur in the future that would be addressed in updates of this plan:

Remove water quality standards covering Tribal waters: Once tribes have set EPA-approved water quality standards, BWQP should remove the water quality standards for those waters on tribal lands.

Make Lake Tahoe water quality standards consistent with California standards: Currently, the Nevada standards for Lake Tahoe are not consistent with California standards. There has been interest by NDEP, EPA and Lahontan Regional Water Quality Control Board.

Revise Las Vegas Wash RMHQs and TMDL: Wastewater treatment facilities in the Las Vegas area are examining options for the disposal of treated effluent. The selected alternative could result in a significant change to loads within the Wash, and revised RMHQs and TMDL may be required.

Use Attainability Analyses – Municipal and Domestic Supply: Depending upon the success of efforts to review drinking water as a use for the Lahontan Valley waters, other UAAs may occur in the future.

Additional Tiered Aquatic Life Use (TALU) Efforts: Currently, TALUs are scheduled to be developed for the Truckee and Carson rivers. Based upon the success of those efforts, TALUs may be developed for other waters in the future.

Impairment Assessment Guidance: Several states have developed weight of evidence approaches for assessment waterbody health using chemical, biological and physical conditions.

As BWQP develops more and more tools for evaluating biological and physical conditions, it is expected that an assessment guidance document will be needed in the future, providing protocols for using chemical, biological and physical conditions together to determine impairment.